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CHARTS OF FAINT STARS FOR MAGNITUDE COMPARISON.

BY R. H. TUCKER, JR.

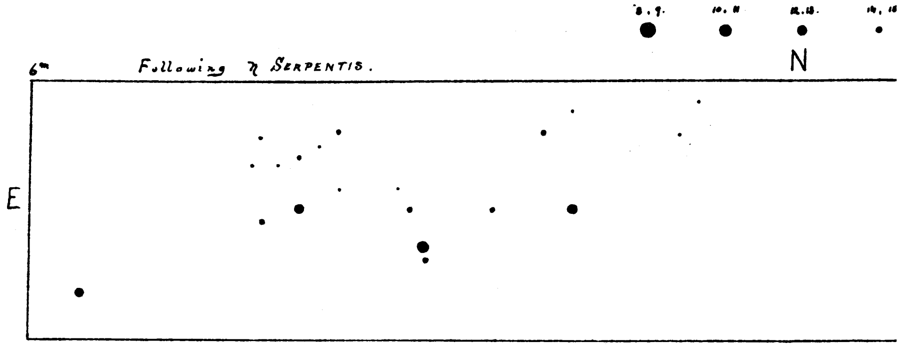
During investigations at the Harvard College Observatory, to fix a scale of Standard Magnitudes, a series of small charts were made to show the reach of the 15-inch telescope of that observatory. The charts were arranged according to the following system: Bright stars were selected near the equator, at intervals of about 1^h, and the chart was begun at 2^m of Right Ascension following the bright star, extending to 6^m following; with a width of 5′ of Declination each side. So that the charts were 4^m of Right Ascension in length, and 10′ of Declination in width.

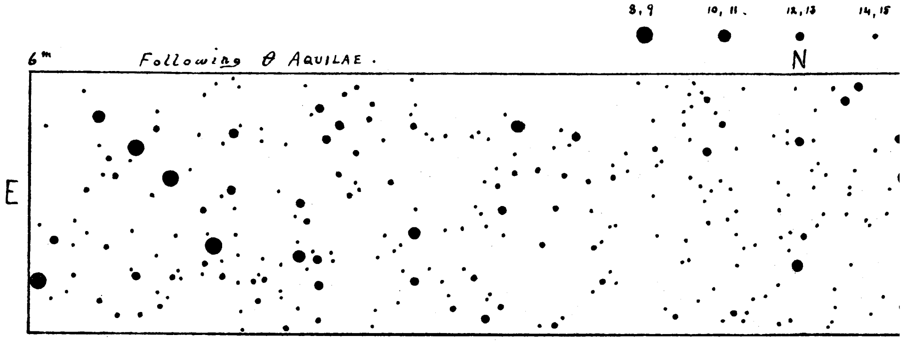
The original charts contain all stars seen, down to a magnitude estimated as 14th. These were afterwards revised, in part, at the Naval Observatory, with the 26-inch telescope, and more stars added to show the reach of that instrument.

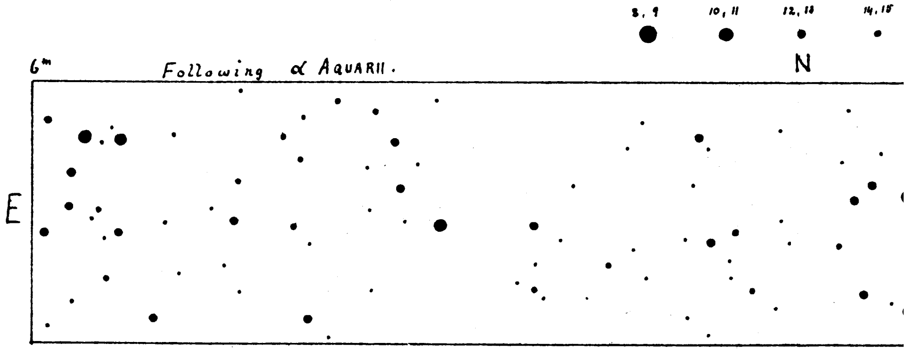
In August of this year I took up some of the charts, with the 36-inch telescope of the LICK Observatory, revising and when necessary correcting the originals, and adding the stars within reach. The magnitudes of such stars as had already been plotted were in general adopted, and the new ones added were estimated on approximately the same scale, some falling well within the limits of that scale, but the greater part being fainter. These fainter stars were estimated as 16th and 17th magnitude. The power used was 350, and while no effort was made to choose especially fine nights, all were good. No star was entered without being distinctly seen and checked; and while it seems probable that from the loss of sensitiveness in the eye, having to turn from the telescope to a working chart, and return to check the place, some of the fainter stars have escaped, I believe the charts will contain all the 16th magnitude, and the greater part of the 17th.

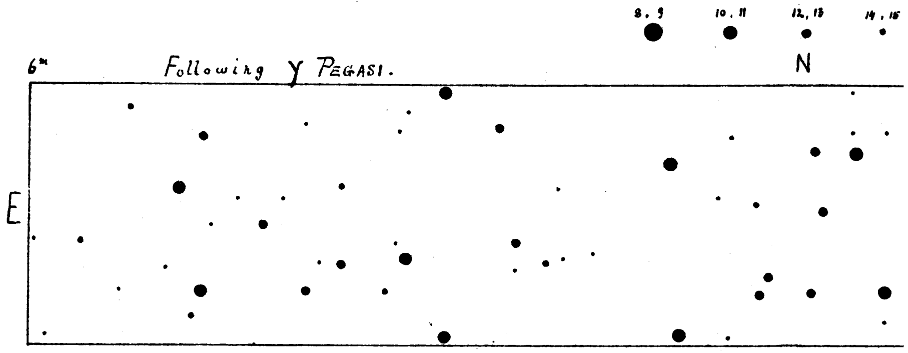
Since it seems sufficient for the purpose to take charts at intervals of two hours, thus always presenting one within easy reach and advantageous position for comparison, I have numbered those selected in accordance with this plan; No. IX having the approximate Right Ascension of 18^h, and No. XII that of 0^h.

The accompanying charts follow the stars given below, always

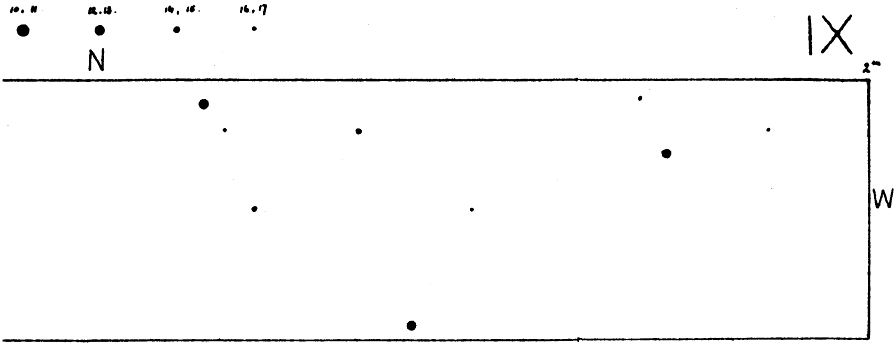

Following η Serpentis.


Following θ Aquilae.

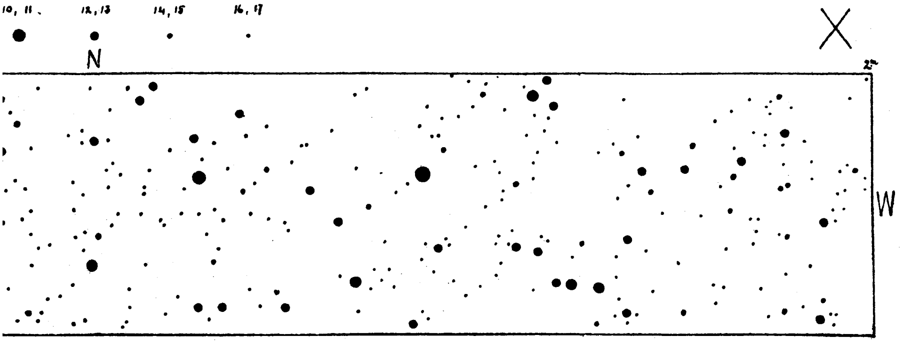

Following α Aquarii.


Following γ Pegasi.

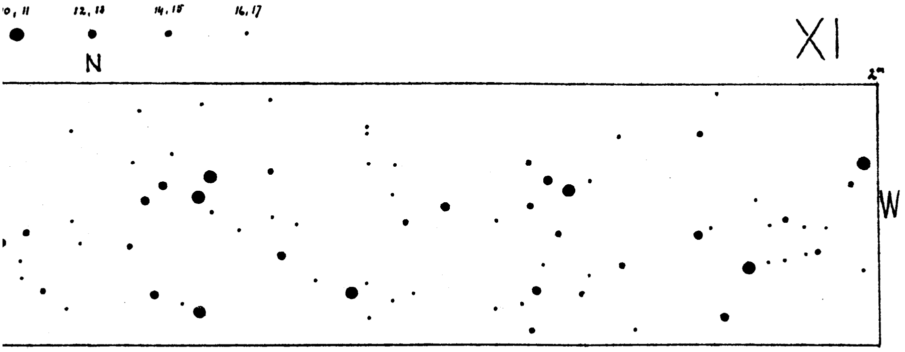
IX



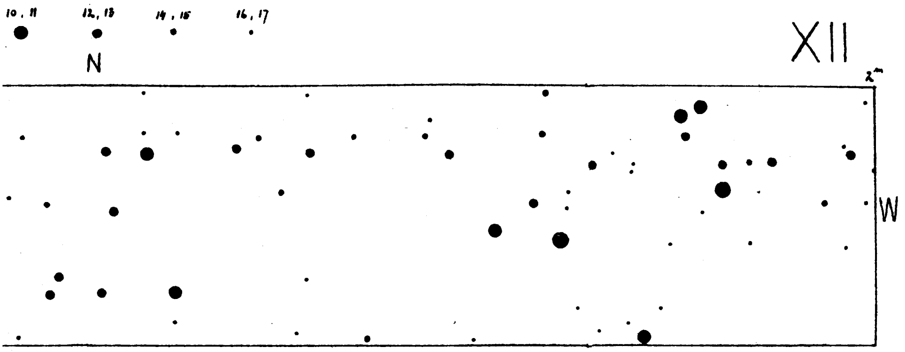
X



XI



XII



R. H. Tucker Jr. Del. 1893.

by 2^m; extending 5′ each side of the bright star, of which the place for 1893 is entered in the list.

IX.	Follows	η *Serpentis*	18^h	16^m	− 2° 56′
X.	"	θ *Aquilæ*	20	6	− 1° 8′
XI.	"	α *Aquarii*	22	0	− 0° 50′
XII.	"	γ *Pegasi*	0	8	+ 14° 35′

The scale of magnitudes is given for each two units of the system, the brightest type including, as well, all stars brighter than 8th magnitude.

The faintest type is made up entirely of new stars added with this telescope, but, as already stated, some new ones fall within the limits of brighter types and have been so plotted.

A few stars plotted at Cambridge were not seen at Washington; and a few of those on the charts as obtained by me, were not found here. These were most probably due to some misidentification of the places, since when the region happens to have but few stars there is no good configuration to follow.

These four charts contained 230 stars, after the corrections had been made here and missing stars omitted. The 36-inch telescope adds 491 to the same regions, 470 of which are estimated as 16th and 17th magnitude.

The total number plotted on the four charts is 721.

The stars on the charts fall into the following five grades, according to the numbers given below:

8 and 9	7
10 " 11	34
12 " 13	87
14 " 15	123
16 " 17	470

The numbers show a large proportion of the fainter type, and it is probable that more of the new stars added should be included in the next grade above, 14 and 15.

These charts may serve to show the reach of photographic plates, and it can safely be predicted that those containing all stars of the charts will include the 17th magnitude.

R. H. TUCKER, JR.

LICK OBSERVATORY, November 6, 1893.